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Automatic Content Extraction (ACE) Program

**INVITED SPEAKERS:**

Barbara Tversky, Stanford University, USA  
Fabio Pianesi, ITC-IRST, Italy

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**CONFERENCE WEBSITE:**

<http://epsilon3.georgetown.edu/discours/spacetime.html>

## PREFACE

Temporal and spatial information is ubiquitous in natural language, yet many challenging computational issues are relatively unexplored. While corpus-based methods have accelerated progress in other areas of NLP, they have yet to make a substantial impact on the processing of temporal and spatial information. Evaluations of information extraction tasks as in the Message Understanding Conferences have revealed some of the challenges inherent in the temporal and spatial portions of those tasks as well as some encouraging results from the evaluated systems. Current commercial interest and funding initiatives in this area make this an excellent time to revisit these problems. Finally, there are sizeable communities of people working in temporal databases, knowledge representation, and theoretical computer science who are looking for real problems to work on; spatial and temporal phenomena in natural language offer an abundant supply of such problems.

A variety of different application areas stand to benefit from progress in spatial and temporal information processing. These areas include:

- machine translation (e.g., translating temporal and spatial references)
- question answering (e.g., answering "when" or "where" questions)
- information extraction (e.g., normalizing values in spatial and temporal databases, disambiguating place names using a gazetteer)
- summarization (e.g., producing temporally coherent summaries of multiple documents, or generating route plans)
- information retrieval (e.g., indexing broadcast news by event time)
- information visualization (e.g., constructing event chronologies, geospatial visualization)
- multimodal interfaces (e.g., interfaces to simulations, gesture and speech input graphical applications, navigation systems)
- interfaces to spatial and temporal databases (e.g., normalizing temporal and spatial references)
- multimedia presentations (e.g., generating textual descriptions or captions, scene and route descriptions, generation of spatio-temporal maps).

Addressing both temporal and spatial domains in a single workshop can be useful because of the many issues in common across these domains. A researcher working in one of these domains can often benefit from being aware of approaches in the other. For example, systems that process temporal or spatial information need to deal with 'absolute' references ("November 18, 1999", "Toulouse"), as well as relative references such as indexicals ("now", "here"), and references stated in terms of offsets from some position in a frame of reference ("two weeks ago", "thirty miles north of Paris"). Both temporal and spatial representations need to address indeterminacy and vagueness, including non-specific references ("some time in June", "a town in Provence"), vague predicates ("nearly a year ago", "near Dusseldorf"), and fuzzy boundaries ("Tuesday morning", "southern England"). There are also many parallels between the way events are characterized in time and objects are characterized in space. For example, events can be described relative to some point or interval in time (e.g., "I met John yesterday. He was crossing the street.") while objects in space can be described in relation to some place, object, or in terms of movement (e.g., "The cup was on top of that. It fell off.>").

This workshop brings together researchers representing spatial and temporal information in natural language. The 14 papers presented here were selected by the Program Committee from 24

submissions. These papers, which represent work by scientists in 9 countries, provide a variety of interesting perspectives in areas such as:

- the semantics of temporal adverbs and spatial prepositions
- application of models of tense, aspect, modality, and discourse structure to linguistic analysis
- representation of reference frames and geometric, cognitive, and functional relationships between objects
- automatic annotation methods and annotation schemes for representing events, times, and the relations between them
- systems which integrate together spatial and temporal representations.

It is especially encouraging to note that these papers rely on evidence drawn from a variety of different natural languages.

We would like to thank the authors, whose significant contributions made the workshop possible, and the members of the Program Committee, who assisted in reviewing papers and guiding the overall organization of the workshop. We are especially grateful to the invited speakers Barbara Tversky and Fabio Pianesi. Thanks are also due to Anthony Davis, Keith Miller, and Leo Obrst, who provided assistance in reviewing, and ACL representatives Rebecca Bruce, Patrick Saint-Dizier, and Roberto Zamparelli, who helped make it all happen.

*Lisa Harper, Inderjeet Mani, Beth Sundheim*  
Organizers